

Fig. 1 shows a schematic timing diagram of the sequence of the intake, compression, work and expulsion phases of a four-cylinder internal combustion engine; Figs. 2a and 2b show schematic timing diagrams of the output signals of a first exemplary embodiment of a phase transducer; Fig. 3 shows a schematic timing diagram of an outcome that characterizes the working phases of the individual cylinders of the engine of Fig. 1; Figs. 4a through 4d show schematic timing diagrams of the output signals of a second exemplary embodiment of a phase transducer; and Figs. 5a through 5c show schematic timing diagrams of outcomes that characterize the working phases of the individual cylinders of the engine of Fig. 1.

In Fig. 1 of the present patent application, the sequence of the individual phases of an internal combustion engine is shown over time. These phases correspond to the cycles of an internal combustion engine as shown and described in further detail in DE 197 43 492 A1.

In Fig. 1 of the present patent application, the engine has four cylinders Z1, Z2, Z3, Z4. In each of these cylinders, in an intake phase S, air is first aspirated into the combustion chamber via the intake manifold of the engine. Then, in a compression phase V, the aspirated air is compressed in the combustion chamber. Simultaneously in this compression phase V, the fuel is injected via an injection valve directly into the combustion chamber. In an ensuing working phase A, the fuel present in the combustion chamber is ignited with the aid of a spark plug. The fuel combusts, and the resultant expansion of the fuel-air mixture sets the piston of the engine into motion. After that, in an expulsion phase B, the combusted fuel-air mixture is expelled from the combustion chamber.

By now, the crankshaft of the engine has passed through an angle of 720 degrees, and the aforementioned phases of the engine can begin over again.

The individual phases S, V, A, B in the individual cylinders Z1, Z2, Z3, Z4 are controlled or regulated with the aid of at least one camshaft and associated valves.